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| Project Title: | Improving Patient Safety/Quality with Health Information Technology Implementation |
| Principal Investigator: | Reiling, John G., M.H.A., M.B.A., Ph.D. |
| Organization: | St. Joseph's Community Hospital |
| Mechanism: | RFA: HS04-011: Transforming Health Care Quality through Information Technology (THQIT) |
| Grant Number: | UC1 HS 015284 |
| Project Period: | 09/04 – 09/08, Including No-Cost Extension |
| AHRQ Funding Amount: | \$1,500,000 |
| Summary Status as of: | September 2008, Conclusion of Grant |

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve the quality and safety of medication management via the integration and utilization of medication management systems and technologies.

Business Goal: Implementation and Use

Summary: St. Joseph's Community Hospital of West Bend, Wisconsin, began building a new 80-bed hospital around the date this grant was awarded, with a design focusing on patient safety. St. Joseph's has identified health information technology (IT) as a necessary component of safety-driven design. This project is intended to support the implementation of an Epic-integrated system between the hospital, West Bend Clinics, and The Kathy Hospice. St. Joseph's believes that a culture of patient safety involves not only developing values and practices but also continually striving for improvement; collaboration with the National Learning Lab helped to define this culture and reassess previous standard procedures in light of this goal. Health IT enhances the ability to collect and analyze reporting data when adverse events do occur. Automated surveillance of data can detect triggers that identify adverse events that may not have been detected through chart review or reported voluntarily. The Epic system is an integrated inpatient clinical package of software developed by Epic Systems Corporation, providing electronic support to both direct and indirect patient care. The Epic system includes electronic documentation for nurses and physicians, clinical pathways and protocols, efficient patient management tools for the emergency department, electronic medical records (EMRs), automated pharmacy communication and workflow assistance, electronic medication administration records (eMAR), computerized provider order entry (CPOE), bar-coding, and centralized scheduling. Implementation began at our existing small community hospital and continued at the new replacement hospital. It also connected the Epic system to multi-location clinics (West Bend Clinic) and a residential hospice facility (the Kathy Hospice). St. Joseph's identified medication errors, near misses, and preventable adverse drug events (ADEs) as the adverse events that would be most significantly reduced by the implementation of Epic. As a result, this study was focused on these types of errors.

Specific Aims

- Implement Epic, diffused across a community and service area-wide system of St. Joseph's Community Hospital of West Bend. **(Achieved)**
- Document latent conditions, and discuss the roles Epic and safe design principles have in meeting them, either directly or indirectly. **(Achieved)**
- Identify the prevalence of adverse events, specifically medication errors, near misses, and preventable adverse drug events, before and after Epic was implemented. **(Achieved)**
- Measure the length of stay, patient satisfaction, and cost in the current system, and then after Epic was implemented and the new hospital was built. **(Achieved)**

- Develop a generalized implementation plan that can be used by other small community hospitals. (Achieved)

2008 Activities: Data collection from the new facility concluded in 2008. Analyses are ongoing, with dissemination efforts to follow. Some elements of the system, including CPOE, were not implemented during the term of the grant, but, due to ongoing support from the hospital, were scheduled for implementation later in the year or in 2009.

Preliminary Impact and Findings: The project analyzed qualitative and quantitative data in order to develop a complete picture of patient safety, comparing conditions prior to Epic system implementation to those with the system in the newly-built hospital. Methods employed included workflow observation; surveys of providers and patients; interviews, focus groups, and data from hospital charts; in-house incident reporting systems; and the Epic system. Prior to the implementation of Epic and the opening of the new hospital, around 12,000 near misses and medication errors were reported in a 12-month period. This was a period of heightened awareness and screening due to St. Joseph's participation in the Institute of Health Improvement (IHI) Impact Project. The number of acute admissions during that same period was about 4,000, so there were approximately 3 near misses and/or errors per patient. Due to the small number of cases available for the medication error observation study, the results lack the sensitivity to statistically demonstrate effects. The analysis of latent condition data demonstrated improvement in all but one condition—fatigue. The adverse events of falls and infections declined since 2002. Any adverse events that were zero before the opening of the new hospital stayed at zero throughout the study period. The number of transfusion related events stayed flat over the entire study period, averaging 0.3 percent; most of these were considered non-preventable. Within the samples we took, medication errors and adverse drug events (ADEs) declined since 2002; ADEs declined dramatically during the study period, particularly in the Surgical unit and Emergency Department. During the study period, length of stay declined from 5.25 days to 4.43 days for Medicare patients, and from 4.14 days to 3.64 days for acute patients. Expenses per adjusted admission increased from \$5,268 to \$7,808 over the study period. Adjusting for inflation, interest, depreciation, and corporate overhead/management fee, expenses decreased from \$5,540.23 to \$5,533.95. Compared to pre-test data, there is a higher expectation by St. Joseph's patients to be involved with their care. Patients are more comfortable asking questions about their care and about important processes of caregivers, such as medications and hand washing. Generally, there is an improving trend in processes such as discharge planning, hand washing, and medication management as it relates to patient involvement. External factors such as better informed consumers or insurance company policies may also be influencing this improvement. The improvements have yet to yield a statistically significant improvement in the quality of care, but the trend is positive. It is important to note that, although the changes in many latent conditions may be attributable to Epic implementation or the design of the new hospital, this reduction cannot be traced to any specific cause. The interplay between safety culture, management focus, process change, facility design, and the implementation of Epic may all contribute to the decline in adverse events.

Selected Outputs

Reiling JG. Safety by design: safe design of healthcare facilities. *Quality and Safety in Health Care* 2006 Dec;15:134-40.

Reiling JG, Knutzen BL, Wallen TK, et al. Enhancing the traditional hospital design process: a focus on patient safety. *Joint Commission Journal on Quality & Safety* 2004 March;30(3):115-24.

Reiling JG, Hughes RG, Murphy M. Patient safety and quality: an evidence-based handbook for nurses. The impact of facility design on patient safety. Rockville, MD: Agency for Healthcare Research and Quality. Publication No. 08-0043; 2008.

Reiling JG. Safe by design—patient safety in hospitals: a serious issue. Dansk Selskab for Kvalitet–Denmark Newsletter 2007 Oct;15(3).

Reiling JG. Safe by design: designing safety in health care facilities, processes, and culture. Oakbrook Terrace, Ill: Joint Commission Resources; 2007.

Reiling JG, Chernos S. Human factors in hospital safety design. In: Carayon P, editor. Handbook of Human Factors and Ergonomics in Health Care and Patient Safety. New Jersey: Lawrence Erlbaum Associates; 2007. p. 275-86.

Reiling JG. Safety culture and organizational issues: creating a culture of patient safety through innovative hospital design. In: Advances in Patient Safety: From Research to Implementation. AHRQ Publication Nos. 050021 (1-4); 2005 Feb;2:425-39.

Carlson School of Management: Designing a safe hospital. Publication 1 Series. Minneapolis: University of Minnesota; 2002.

Grantee’s Most Recent Self-Reported Quarterly Status: At the conclusion of the project, all milestones were met and spending was on target.

Milestones: Progress is mostly on track.

Budget: Somewhat under spent, approximately 5 to 20 percent.